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Claremont McKenna College

The Balance Between Financial and Quality Performance in For-Profit
Hospitals versus Non-Profit Hospitals

submitted to
Professor Ananda Ganguly

by
Blake Seidner

for
Senior Thesis
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Abstract

Recent trends of financial distress for non-profit hospitals and the uptick in acquisition of these hospitals by for-profit entities indicate different focuses from the management of each type of hospital. Using data on hospital quality and basic financial measures, this study examines shift in the balance of financial and quality performance. The dataset focuses on private non-profit and for-profit hospitals with low bed counts, ranging from 50-200 total beds. Results indicate a positive relationship between for-profit status and basic financial performance measures, such as profitability, and a negative relationship with patient experience, cost reduction for the patient, and overall quality. This signals a tradeoff between financial performance and quality, especially measures relating to the customer. For-profit hospital management places more of an emphasis on the financial performance while non-profit hospital management demonstrates a balance between financial performance and high quality performance. Without being involved in hospital management decision-making, examining hospital outcomes is the best way to give insight into how hospital management shifts performance priorities by different types of ownership.

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Chapter 1. Introduction

In this study, I examine the relationship between profit statuses of hospitals – whether or not a hospital is for-profit or non-profit – and the quality of hospital care for small hospitals (bed counts ranging from approximately 50-200 beds). In addition to exploring this relationship, I also examine the effect of hospital and market characteristics such as Case Mix Index and state uninsured rate on patient revenues and profitability.

In designing the Balanced Scorecard and its use in accounting, Kaplan and Norton (1996) suggest that the implementation of the Balanced Scorecard “gives managers a way of ensuring that all levels of the organization understand the long-term strategy and that both departmental and individual objectives are aligned with it,” instead of having individual incentives being tied solely to short term financial performance.¹ Kaplan and Norton suggest that managers can use the Balanced Scorecard in an attempt to balance financial performance with other long-term performance goals such as customer satisfaction, keeping efficient internal business processes, and continuing Learning and Growth. I believe that the managers of for-profit hospitals have to show greater performance in financial measures than their non-profit managerial counterparts, and will accordingly shift the balance of perspectives more towards the financial perspective and away from quality and customer perspectives than non-profit hospitals. My study

¹ Kaplan, Robert S. and David P. Norton, “Using the Balanced Scorecard as a Strategic Management System.” (1996).

provides evidence of the redistribution of weight between quality and financial performance between for-profit and non-profit hospitals.

To answer this research question, I collected data on approximately 250 hospitals in the United States ranging in bed size from 50-200 beds. I used comprehensive quality data produced by the Center for Medicare and Medicaid Services – Total Performance Score – which can be broken down into four segments of quality measurement. I also collected data regarding the revenues and net incomes of these hospitals and their status as private non-profit or private for-profit. State-level market characteristics were used as control variables to take out some regional differences due to varying uninsured rates and effects due to the election of Medicare Expansion.

I found evidence of the shift such that there was more emphasis on financial performance in for-profit hospitals versus non-profit hospitals, which coincided with a shift away from performance in quality measures in these same hospitals. I also found that state characteristics have significant effects on financial performance, but these are out of managers' control but may lead to objectives to mitigate unfavorable effects due to state-level market characteristics. The findings from this study may not apply to large, metropolitan hospitals as these hospitals face different challenges and pressures than these smaller, more regional hospitals.

In the next two sections of the paper, I discuss previous literature on shifts towards or away from quality performance based on for-profit status, as well as some drivers of financial performance for hospitals as well as my hypotheses. Following, in

Chapter 4, I lay out my methodology in detail, followed by results in Chapter 5, discussion of results in Chapter 6, and conclusions in Chapter 7.

Chapter 2. Literature Review

The rising number of not-profit hospitals facing bankruptcy or financial distress suggests the potential for these hospitals to be taken over by for-profit organizations. The differing financial objectives of each ownership type will affect how the hospital runs, and thus likely affect the quality of the hospital. For each ownership status, there are three possibilities: decrease in quality from not-profit to for-profit, continuance of the same quality level, or increase in quality. The empirical studies that most closely examine this follow for each conclusion.

2.1 Decrease in Quality

Picone *et al.* (2002)² look into whether the conversion to for-profit status of a hospital is harmful to patients and to Medicare. The study examined the effects due to conversions from not-profit to for-profit and vice versa. The researchers hypothesize that conversion to for-profit should reduce quality because of the increase in profit seeking

² Picone, Gabriel, Shin-Yi Chou, and Frank Sloan. "Are For-Profit Hospital Conversions Harmful to Patients and to Medicare?" *The RAND Journal of Economics* 33, no. 3 (2002): 507-23. <http://www.jstor.org/stable/3087470>.

strategies, and the reverse should occur with the conversion to not-profit. The study controlled for local payment rates, population density, and year. The control for local payment rates were based on the wage index that is used by Medicare to set their payment rates at hospitals. This wage index is location specific and gives an idea of the market of the hospital. These explanatory variables help control for technological and political changes, as well as local price discrepancies. The study found that conversion to for-profit status led to an increase in mortality rates, the study's measure of quality, but did not find evidence of the reverse effect. This finding led to the conclusion that the change in quality was not the result of conversion of ownership status, but due to the ownership status itself.

2.2 No Net Change

Farsi (2004)³ examined the effect of conversion between not-profit to for-profit statuses on healthcare quality for hospitals in California. The study focused on the time period of 1990-1998. The study examined the health outcomes of elderly patients treated for Acute Myocardial Infarction (AMI) and Congestive Heart Failure (CHF). To measure quality, the study used risk adjusted mortality rates for these conditions as an indicator. The study controlled for time variations of quality trends before the conversion through the use of a linear trend. It also controlled for Medicare status, by choosing patients over the age of 65, and for hospital selection bias by sampling acute conditions treated through

³ Farsi, Mehdi. "Changes in Hospital Quality after Conversion in Ownership Status." *International Journal of Health Care Finance and Economics* 4, no. 3 (2004): 211-30. <http://www.jstor.org/stable/3528898>.

emergency rooms. The purpose behind these controls is to isolate the effect of conversion on quality, and to eliminate both patient selection and admission bias in hospitals, as acute conditions are most likely to be treated at the nearest hospital, due to the Emergency Medical Treatment and Labor Act (EMTALA), which requires hospitals to treat all patients in the emergency rooms regardless of their ability to pay. The study found that the conversion to for-profit led to an increase in AMI mortality rates, while the conversion to not-profit led to an increase in the CHF mortality rates. The study concluded, “health outcomes in different diagnoses may represent different dimensions of hospital quality” (212). This suggests more research needs to be done to fully support this hypothesis.

A popular theory regarding the label of not-profit is that it can be used to indicate quality. That is, companies will take not-for-profit status in order to signal the quality of their institution. Malani and David (2008)⁴ empirically tested this theory by looking at whether firms in the hospital, nursing home, and child care industries advertise their not-for-profit status on their website or yellow pages listing. The rationale behind taking not-profit status, at least for a hospital, should be to provide more community benefits, as outlined in the Affordable Care Act and the Community Health Needs Assessment. Malani and David (2008) outline the four major theories in existing literature. These theories include principals who “have quasi-altruistic motives, such as providing high-quality service, take non-profit status to financially support these motives,” providing community benefit for an underprovided government good, taking advantage of the tax

⁴ Malani, Anup, and Guy David. "Does Nonprofit Status Signal Quality?" *The Journal of Legal Studies* 37, no. 2 (2008): 551-76. doi:10.1086/589668.

breaks as a for-profit in disguise, and the use of not-profit status as an indicator of quality. For the last theory, the rationale lies in the fact that not-profit status removes profit incentive, thus cost cutting through the reduction of quality will not increase the money taken home, so any incentive to cut quality is gone.

The study found that more often than not, not-profit firms fail to indicate their not-profit status, whether that is through their website or yellow pages listing. Thus the study found little support for the theory that not-for-profit status is used to indicate quality. The study does acknowledge that they did not examine other forms of advertisements such as television ads, radio ads, or other forms of print ads. These may be used more often to indicate the not-for-profit status to consumers. The authors posit that more research must be done on this theory to fully support their conclusion.

2.2.1 The Spillover Effect

An effect mentioned, but not studied, in many hospital studies is the spillover effect. This effect in a healthcare setting describes a situation where the presence of for-profit hospitals results in an increase in efficiency for not-profit hospitals. Kessler and McClellan (2002)⁵ examined the effect of hospital ownership on healthcare productivity and financial performance. The study controlled for selection bias and the spillover effect of for-profit hospitals on other hospitals in the area. The idea behind this is that by controlling for these effects, the study can isolate the effect of ownership status on

⁵ Kessler, Daniel P., and Mark B. McClellan. "The Effects of Hospital Ownership on Medical Productivity." *The RAND Journal of Economics* 33, no. 3 (2002): 488-506.
<http://www.jstor.org/stable/3087469>.

hospital productivity and remove differences in patient populations. The study found that areas with for-profit hospital have lower expenditures without changes in health outcomes. This highlights the spillover effect for-profit hospitals have on other hospitals in their regions. The study acknowledges that the spillover effect is not separated from direct effect of hospital ownership, but still provides us insight that the presence of for-profit hospitals does not decrease the quality of surrounding hospitals, but may help increase the efficiency of operations. This is important because it demonstrates that the quality of an institution doesn't necessarily have to fall when increasing efficiency, and for a not-profit hospital, the patient is the only one who stands to benefit from this effect through lower prices, increased future quality, or a possible expansion of services.

A limitation discussed by Kessler and McClellan (2008) was the small percentage of hospitals that were of for-profit status. The recent trend of financial troubles for not-for-profit hospitals and takeovers of these struggling hospitals by for-profit enterprises could increase the importance of these findings. Both the direct and spillover effects could increase and truly influence how hospitals operate, regardless of ownership.

2.2.2 The Effect of the Uninsured

Batty and Ippolito (2017)⁶ examined the effects of the recent fair pricing laws on the quality of care given. Fair pricing laws put a cap on how much a hospital can charge an uninsured patient. Before these laws, insurance companies negotiated a price that they would pay to hospitals for a treatment, which was often below the list price, but uninsured patients were charged the full list price. The cap put in place by these laws prevents hospitals from charging the uninsured more than they would from an insurance company for a certain service. The study examined whether these fair pricing laws affected both the quantity and quality of care given to uninsured patients. The study found that quantity of care was reduced with the implementation of the fair pricing laws, with both for-profit and non-profit hospitals acting similarly. Quality of care was measured using mortality rates, and rates of preventable complications. The researchers found that both short term and long term quality of care for the uninsured were not significantly affected by fair pricing laws.

2.3 Increase in Quality

Pai *et al.* (2017)⁷ studied the effects of hospital quality and efficiency on hospital closures. Using various measures of efficiency and quality, as well as interaction variables between these two areas, the study found that multiple quality measures and for-profit status were positively correlated with hospital survival. This indicates a

⁶ Batty, Michael, and Benedic Ippolito. "Financial Incentives, Hospital Care, and Health Outcomes: Evidence from Fair Pricing Laws." *American Economic Journal: Economic Policy* 9, no. 2 (2017): 28-56. <https://doi.org/10.1257/pol.20160060>

⁷ Pai, Dinesh R., Hengameh Hosseini and Richard S. Brown. "Does efficiency and quality of care affect hospital closure" *Health Systems* (2017). DOI: 10.1080/20476965.2017.1405874

potential positive relationship between quality and for-profit status. In light of the financial struggles of not-profit hospitals today, this potential relationship must be studied further. Other research indicates either a decrease in quality or no change in quality comes with profit status, which means there might be an issue of correlation between these two independent variables in the regression created by Pai *et al.*

2.4 Other Quality Measures

2.4.1 Patient Experience and Perception

Jha *et al.* (2008)⁸ examined hospital performance over a range of patient experience measures, and examined whether theoretically key hospital characteristics for patient experience are actually correlated with better patient experiences. These key hospital characteristics were measures such as nonacademic status and for-profit status. To measure patient experience, the study used data from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey which is filled out by patients after hospital visits. The researchers found that fewer patients gave high ratings if they were treated in a for-profit hospital versus those treated in a non-profit hospital. Taking a closer look, for-profit hospitals received worse performance grades than non-profit hospitals in all areas of the HCAHPS survey. Overall, the majority of patients were satisfied with care, but there still was a significant difference between for-profit and non-profit hospitals.

⁸ Jha, Ashish K., MD, MPH, et al. "Patients' Perception of Hospital Care in the United States" *New England Journal of Medicine* (2008): 359:1921-1931. DOI: 10.1056/NEJMsa0804116

The study also found that a higher ratio of nurses to patient-days corresponded with higher patient ratings on the HCAHPS survey. Comparing the highest quartile of this ratio to the lowest quartile, the largest performance differences in patient experience were in nursing services, discharge instructions, communication with nurses, and communication about medications. The highest quartile hospitals in regards to the nurses to patient-days ratio performed better in these areas, which is in-line with the performance of non-profit hospitals in comparison to for-profit hospitals. This suggests that non-profit hospitals relatively employ more nurses than for-profit hospitals.

2.5 Profitability of Hospitals

Through the declaration of non-profit or for-profit status, hospital management is generally announcing their financial goals. For-profit hospitals seek to maximize profits with methods that can vary by institution. Non-profit hospitals serve to provide community benefit, but some believe that non-profit hospitals act as for-profits in disguise.

2.5.1 Increased Profitability of For-Profit Hospitals

Picone *et al.* (2002)⁹ examined hospital level finances and staffing in addition to quality of care. The study found that the conversion from non-profit to for-profit ownership resulted in a significant increase in operating margins following the conversion, and that leading up to the conversion, operating margins followed a declining trend. This observed trend is in line with the idea that for-profit institutions seek to maximize profits. Additionally, this trend suggests that declining financial position may lead to the conversion from non-profit to for-profit status. The study also found that following conversion to for-profit status, hospital employment declined, coinciding with the observed decline in quality mentioned in section 2.1, while hospitals converting to non-profit status experienced an increase in employment. Employment of hospital staff is often a large expense for hospitals, and declining employment fits with profit maximization principles.

Similar to these findings, Jha *et al.* (2008)¹⁰ found that hospitals with relatively higher employment of nurses corresponded to better patient experience than lower employment rates. In conjunction with their findings that non-profit hospitals give patients a better experience than for-profit hospitals, a logical conclusion is that non-profit hospitals are more likely than for-profit hospitals to be in the highest quartile of the nurses to patient-days ratio. This positive correlation between high nurse to patient-days ratio and non-profit status leads me to the conclusion that the profit maximization of for-

⁹ Picone, Gabriel, Shin-Yi Chou, and Frank Sloan. "Are For-Profit Hospital Conversions Harmful to Patients and to Medicare?" *The RAND Journal of Economics* 33, no. 3 (2002): 507-23. <http://www.jstor.org/stable/3087470>.

¹⁰ Jha, Ashish K., MD, MPH, et al. "Patients' Perception of Hospital Care in the United States" *New England Journal of Medicine* (2008): 359:1921-1931. DOI: 10.1056/NEJMsa0804116

profit hospitals would lead to lower rates of nurse employment and thus lower patient experience ratings.

2.5.2 Effect of the Uninsured on Profitability

Garthwaite *et al.* (2018)¹¹ researched the effects of uninsured people on hospital profit. EMTALA requires hospitals to treat anybody in need of emergency medical treatment, regardless of their ability to pay the hospital bill. Additionally, “nonprofit hospitals must provide a community benefit in order to maintain their tax exemptions”.¹² As outlined by Nicholson *et al.* (2000)¹³, the most obvious community benefit a hospital can provide is uncompensated care, which is most often provided to the low-income, uninsured population. Due to EMTALA and requirements to maintain tax exemptions, Garthwaite *et al.* (2018) argue that non-profit hospitals serve as insurers of last resort, bearing the majority of the cost of providing uncompensated care. The study calculated that each additional uninsured person in a state is associated with approximately \$800 in uncompensated care costs. The study further calculated that since eight percent of uninsured people report an in-patient hospital visit, the \$800 cost per uninsured person corresponds with approximately \$11,000 in uncompensated care costs per uninsured inpatient visit. These costs would significantly drive down profit margins of hospitals

¹¹ Garthwaite, Craig, Tal Gross, and Matthew J. Notowidigdo. “Hospitals as Insurers of Last Resort” *American Economic Journal: Applied Economics* 10, no. 1 (2018): 1-39. <https://doi.org/10.1257/app.20150581>

¹² Garthwaite, Craig, Tal Gross, and Matthew J. Notowidigdo. “Hospitals as Insurers of Last Resort” *American Economic Journal: Applied Economics* 10, no. 1 (2018): 1-39. <https://doi.org/10.1257/app.20150581>. Page 2

¹³ Nicholson, Sean, Mark. V. Pauly, Lawton R. Burns, Agnieszka Baumritter, and David A. Asch. “Measuring Community Benefits Provided by For-Profit and Nonprofit Hospitals” *Health Affairs* 19, no. 6 (2000). <https://doi.org/10.1377/hlthaff.19.6.168>

providing the uncompensated care. The study examined how hospital ownership affected the share of the uninsured population and the effect on uncompensated care costs. They concluded that non-profit hospitals bear more uncompensated care costs than for-profit hospitals, and is even more apparent in for-profit hospitals operating near non-profit hospitals. The authors postulate that this difference may be partly explained by tailoring down the quantity of care provided to uninsured patients to comply with EMTALA but also come closer to meeting financial targets.

The study also found that non-profit hospitals are not able to pass on all of these costs to insured patients, and estimates that hospitals may absorb around 2/3 of the uncompensated care costs. But the costs that are not absorbed may not be passed on to insured patients as they could be offset by government transfers, such as transfers relating to uncompensated care like disproportionate share payments, or other government transfers, like those associated with the Total Performance Score metric, which will be explained later in the paper. Overall, non-profit hospitals bear the majority of uncompensated care costs, driving down profit margins, and potentially leading to financial distress and eventually hospital closure.

2.5.3 Medicare vs. Private Insurance

Selden *et al.* (2015)¹⁴ examined the difference between public and private insurance payment rates for inpatient hospital care. The study examined payment rates over the time period from 1996 to 2012, controlling for inflation and standardized across patient and hospital stay characteristics. In 1996, private insurance had a payment rate 6.1% greater than Medicare payment rates. Over time, this gap widened to 75.3%. These findings were consistent with payment rate estimates from the American Hospital Association Annual Survey of Hospitals. The implication for hospitals is with a state's election of Medicare expansion, more people are covered by Medicare, which reduces the number of people potentially covered by private insurance, and potentially reduces the number of privately insured people. The increased Medicare coverage in combination with widening payment rates is unfavorable for hospital profitability.

2.6 Relating Background Research to the Question

The current sector trends starts to support my hypothesis regarding the managerial focus of non-profit hospitals, at least on a sector-wide level, but my study will check if this is true with more hospital specific data, as well as investigating the other half of the overarching hypothesis regarding the managerial focus of for-profit hospitals.

While this study does not focus on the effects of profit status conversion on quality due to the lack of data available to me, the effects of hospital profit status on quality of care can be helpful in giving an idea of what might happen in a conversion. In

¹⁴ Selden, Thomas M., Zeynam Karaca, Patricia Keenan, Chapin White, and Richard Kronick. "The Growing Difference Between Public and Private Payment Rates For Inpatient Hospital Care" *Health Affairs* 34, no. 12 (2015). <https://doi.org/10.1377/hlthaff.2015.0706>

acquiring a non-profit hospital, the for-profit entity will likely implement most of its operating strategy and values, which will in turn affect various measures of quality. Various aspects of quality will be examined to see where the greatest changes might occur.

Additionally, the exploration into the impact of various market characteristics on hospital patient revenue and profitability will reveal the current effects of these characteristics and may provide insight into how changing healthcare legislation will affect these characteristics and thus patient revenue and profitability. New healthcare legislation may impact certain decisions hospital management can make, but the focus behind this decisions will remain constant.

Through the evaluation of various outcomes, I draw conclusions regarding hospital management's decision making process and the tradeoffs within the framework of the Balanced Scorecard.

Chapter 3. Hypothesis

As outlined in the Introduction, the Balanced Scorecard was designed to help managers keep individual and departmental objectives aligned with both short and long-term goals of the company. This encourages a balance between the performance in the financial perspective and non-financial perspectives such as quality and customer satisfaction. For-profit managers have to show better financial performance than non-

profit managers, leading to a shift in the balance of perspectives, outlined in the following hypothesis.

Hypothesis 1(a): For-profit hospital management places more weight on financial performance and shift away from high performance in quality and customer satisfaction in comparison to non-profit hospitals.

The majority of research regarding hospital quality has focused on using mortality rates as the main indicator of quality. While mortality rates are important to consider when measuring hospital quality, the rates do not capture other important aspects of institutional quality. As noted in the Literature Review, the studies using mortality rates to measure quality found mixed results in regards to the effect from profit status. This alone does not allow me to make an educated hypothesis regarding the effects of profit status on Total Performance Score (TPS). TPS is a multifaceted measure of quality that incorporates other aspects of quality such as patient experience, cost reduction for the patient, and hospital safety. In conjunction with studies concerned with other aspects of quality such as patient experience and the basic economic concept of profit maximization, I am able to make hypotheses regarding the effect of hospital profit status on TPS and consequently each of its components.

Hypothesis 2(a): For-profit hospitals will have lower TPS quality scores.

Hypothesis 2(b): Hospital profit status will not have an effect on the Clinical Care and Hospital Safety components of TPS.

Hypothesis 2(c): Hospital profit status, and more specifically, for-profit status, will have a negative impact on the Patient Experience and Cost Reduction & Efficiency components of TPS.

Such a focus on high performance can lead to worse performance in the financial perspective. With a focus centered on the customer, hospital management's decisions would be rooted in improving patient experience in all aspects, like in communication with staff and low costs. This emphasis may lead to decisions that increase expenses while slowing or lowering revenues. Assuming this is the case, this management focus would lead to financial distress and potential closure if on the extreme side of this scenario. More likely, to remain financially viable, non-profits would perform worse financially than for-profit hospitals, but still at a level where they are not in risk of bankruptcy. Current trends in the non-profit healthcare sector provide some initial support to this hypothesis.

For the year 2017, Fitch Ratings has issued a negative sector outlook for non-profit hospitals and health systems.¹⁵ The reasoning behind this negative outlook is the “longer term view that the sector will be increasingly challenged by regulatory and political uncertainty, the growth in Medicare and Medicaid payors and meager rate

¹⁵ All information in this paragraph is derived from the following PowerPoint: Holloran, Kevin. “Sector Briefing: Nonprofit Hospitals and Health Systems” *Fitch Ratings*, July 2017.

increases”.¹⁶ Under the Trump Administration, there is uncertainty regarding the future of the Affordable Care Act put in place by the Obama Administration. Additionally low commercial insurance reimbursement rate increases in combination with pressure from rising wages and salaries will reduce margins and cost flexibility. Fitch Ratings believes that due to these pressures, mergers and acquisitions activity will continue at a high rate.

In their 2018 sector outlook, both Fitch Ratings and Moody’s issued negative ratings for the non-profit healthcare sector.¹⁷ Moody’s credits this negative outlook to rising expenses and low revenue growth in recent years, and the rise of bad debt in 2017 due to rising copays and high deductible plans. Fitch Ratings kept their negative outlook for many of the same reasons as in their 2017 Sector Briefing.

The current financial situation in the non-profit hospital sector is dire. Since January 2010, 83 rural hospitals have closed down, with many states seeing multiple closures of their local hospitals.¹⁸ According to Bloomberg data, there are currently 26 non-profit hospitals in default or distress, many of which are based in rural areas. Additionally, Bloomberg reports an estimated 44% of rural hospitals currently operate at

¹⁶ Holloran, Kevin. “Sector Briefing: Nonprofit Hospitals and Health Systems” *Fitch Ratings*, July 2017. Slide 2.

¹⁷ All information in the paragraph is from: Ellison, Ayla. “Fitch issues negative outlook for nonprofit hospitals: 4 things to know” *Becker’s Hospital Review*. December 06, 2017, <https://www.beckershospitalreview.com/finance/fitch-issues-negative-outlook-for-nonprofit-hospitals-4-things-to-know.html>

Ellison, Ayla. “Moody’s: Outlook is negative for nonprofit hospital sector” *Becker’s Hospital Review*. December 04, 2017, <https://www.beckershospitalreview.com/finance/moody-s-outlook-is-negative-for-nonprofit-hospital-sector.html>

¹⁸ Ellison, Ayla. “State-by-state breakdown of 83 rural hospital closures” *Becker’s Hospital Review*. January 26, 2018, <https://www.beckershospitalreview.com/finance/state-by-state-breakdown-of-83-rural-hospital-closures.html>

a loss.¹⁹ Continuing with the trend of financial distress in non-profit healthcare, healthcare bankruptcies more than tripled in 2017 while bankruptcy filings overall have been declining since 2010, per Bloomberg.²⁰ As a part of this report, the reduction in Disproportionate Share Hospital payments – payments made by the US government to hospitals that treat a large number of uninsured and Medicaid covered people – is cited as a main reason for the financial distress of rural hospitals.

Much of this is attributable to factors mentioned by Moody's and Fitch Ratings in their negative sector outlooks for the non-profit healthcare industry. With the current financial distress of non-profit hospitals, these hospitals may close down, or be acquired by larger health systems. There has been a rise in for-profit companies acquiring non-profit hospitals.²¹ In combination with Fitch Ratings' prediction of increased Mergers and Acquisitions activity, it is definitely possible to see more non-profit hospitals convert to for-profit entities.

As discussed in the introduction, Total Performance Score has financial incentives aligned with higher scores. This financial incentive should help hospital profitability as theorized by Garthwaite *et al.* (2018) as it would help offset the uncompensated care costs associated with treating uninsured patients. Following Garthwaite *et al.* (2018) further, the uninsured rate should negatively impact profitability since according to the

¹⁹ Moran, Danielle, and Rebecca Spalding. "Hospital Distress to Grow If Congress Closes Door to Muni Market" Bloomberg. December 8, 2017, <https://www.bloomberg.com/news/articles/2017-12-08/hospital-distress-to-grow-if-congress-closes-door-to-muni-market>

²⁰ Ellison, Ayla. "Healthcare bankruptcies more than triple in 2017" Becker's Hospital Review. November 28, 2017, <https://www.beckershospitalreview.com/finance/healthcare-bankruptcies-more-than-triple-in-2017.html>

²¹ Gamble, Molly. "8 Issues Surrounding a For-Profit Company's Acquisition of Non-Profit Hospitals" Becker's Hospital Review. January, 14, 2011, <https://www.beckershospitalreview.com/hospital-transactions-and-valuation/8-issues-surrounding-a-for-profit-companys-acquisitions-of-non-profit-hospitals.html>

study, each additional uninsured person in the state costs a hospital \$800 in uncompensated care. Accordingly, I hypothesize that my data and analysis will have similar findings.

Hypothesis 3(a): Hospitals in the top 50% of TPS will show an increased profitability.

Hypothesis 3(b): Hospitals in states with higher uninsured rates will have lower profitability than hospitals in states with lower uninsured rates.

Another factor affecting profitability is a state's election of Medicare expansion. This expansion of Medicare coverage creates an issue for hospital profitability since payment rate differences between private and public insurance have widened dramatically over the past couple decades, which is outlined in the Literature Review, section 2.5.2. Following this logic I hypothesize a negative relationship between Medicare expansion and hospital profitability.

Hypothesis 3(c): Hospitals located in states who elected for Medicare expansion will be less profitable than hospitals in non-expansion states.

Based on the economic theory of profit maximization, which theoretically only applies to for-profit hospitals, profit status should positively affect profitability. This is consistent with Hypothesis 1c and the research done by Jha *et al.* (2008) and Picone *et al.* (2002). For-profit hospitals often work to cut costs by lowering employment, which increases profitability but also worsens patient experience, and I structure my hypothesis accordingly.

Hypothesis 3(d): For-profit hospitals will have higher profitability than non-profit hospitals.

Shifting to patient revenue, the profit status of a hospital should positively impact patient revenue since profit maximization involves both reducing costs and maximizing revenues. For-profit hospitals likely have negotiated profit maximization prices with insurance companies more so than non-profit hospitals as outlined by Garthwaite *et al.* (2018). Garthwaite *et al.* (2018) also stated approximately 8% of uninsured people reported an inpatient hospital visit per year, so hospitals located in states with higher uninsured rates should see higher patient revenues. For hospitals located in Medicare expansion states, a larger percentage of the population is medically insured, and insured people are more likely to visit the hospital if needed than uninsured people, which I expect to translate to higher patient revenue. The payments received for being in the top 50% of TPS hospitals wouldn't count as patient revenue, and thus should not have an effect on patient revenue.

Hypothesis 4(a): For-profit status and election of Medicare expansion will positively impact the patient revenue of a hospital.

Hypothesis 4(b): Higher state uninsured rates will have a negative impact on patient revenue.

Hypothesis 4(c): Hospitals in the top 50% of TPS will not experience a change in patient revenue on account of their standing in the top 50% of TPS.

Chapter 4. Methodology

4.1 Data Sources

Data was collected from various sources. More specifically, TPS data was collected from the Center for Medicare and Medicaid Services (CMS)²², and hospital characteristics and financial data from the American Hospital Directory. American Hospital Directory draws its data from CMS, the U.S Department of Health and Human Services, Cost Report Data – who obtains information from CMS – and Skilled Nursing Facilities data. State uninsured rates and Medicare expansion data were obtained from the U.S. Census Bureau.

²² “Total Performance Score Information” Medicare.gov,
<https://www.medicare.gov/hospitalcompare/data/total-performance-scores.html>

This study focuses on acute care hospitals, excluding specialty hospitals and critical access hospitals. The sample covers 247 hospitals from all states in the United States. The sample strives to achieve an even mix of private for-profit and private non-profit hospitals, but is weighted towards non-profit hospitals, as that is a more accurate reflection of the composition of hospitals in the country.

4.2 Econometric Models

Through the use of multiple econometric models, I sought to find a relationship between profit status and quality, and within the composite quality measure, which aspects of hospital quality are the drivers of this relationship. The regressions were run using the ordinary least squares method.

Regressions (1)-(6) model the relationship between hospital profit status and various quality measures. Regressions (7)-(8) examine the hospital characteristics and market drivers of hospital profitability and patient revenues. All variables are further explained in the following section.

$$(1) \quad TPS = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(2) \quad ClinicalCare = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(3) \quad PatientExperience = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(4) \quad SafetyScore = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(5) \quad CostRedScore = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(6) \quad TPS50 = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 statusCSprofit + \hat{\varepsilon}$$

$$(7) \quad CSprofit = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 uninsured + \hat{\beta}_3 MedicareExpansion + \hat{\beta}_4 uninsuredXexpansion + \hat{\beta}_5 CMI + \hat{\beta}_6 TPS50 + \hat{\varepsilon}$$

$$(8) \quad patientrev = \hat{\beta}_0 + \hat{\beta}_1 profitstatus + \hat{\beta}_2 uninsured + \hat{\beta}_3 MedicareExpansion + \hat{\beta}_4 uninsuredXexpansion + \hat{\beta}_5 CMI + \hat{\beta}_6 TPS50 + \hat{\varepsilon}$$

If for any reason, a hospital is missing an observation for one of the variables, the hospital was dropped from that specific regression. Missing observations occurred for very few hospitals in various components of TPS because a certain domain could not be calculated for a given hospital. In this case, the three domains that were scored were reweighted to 33.33% each from the original 25% weight.²³

4.3 Dependent Variables

4.3.1 Measuring Quality

The majority of studies researching hospital quality used mortality rates as the indicator for quality. This is an important measure, but does not incorporate many other

²³ Medicare.gov, “Total Performance Score Information”

aspects of quality. Others examine patient experience or infection rates. Each of these measures are good indicators of quality, but it is necessary to look at a composite quality measure as well as each of the components.

Total Performance Score (TPS)

This study assesses hospital quality using Total Performance Score (TPS), which is a composite quality measure developed by the Center for Medicare and Medicaid Services (CMS). It consists of 4 equally weighted domains: a Clinical Care domain, Patient and Caregiver-Centered Experience of Care/Care Coordination domain, Safety domain, and an Efficiency and Cost Reduction domain.

I will examine the effects of various hospital characteristics on TPS to look at how these characteristics may affect hospital quality.

Total Performance Score Components

As explained by CMS²⁴, each domain has various factors that comprise the domain score. The Clinical Care (ClinicalCare) score is made up of three mortality measures. The Patient Experience (PatientExperience) score takes into account eight measures from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, which is a required patient satisfaction survey developed by CMS. The Safety (SafetyScore) score consists of one Agency for Healthcare Research and Quality measure, five healthcare related infection measures, and one pregnancy and delivery care measure. The Efficiency and Cost Reduction (CostRedScore) is based on

²⁴ Medicare.gov, "Total Performance Score Information"

the Medicare Spending per Beneficiary (MSPB) measure. The MSPB is controlled for local wage index to mitigate any regional differences in pricing.²⁵

The mortality indices composing the Clinical Care score are measured in survival rates, so the mortality indices are directly proportional to the Clinical Care score, such that higher survival rates mean a higher Clinical Care score. The Patient Experience score is also directly proportional to its components, with higher scores representing higher patient satisfaction. The Safety score is inversely proportional to its comprising factors. The factors are measures in infection rates and elective early delivery, and lower rates in each factor corresponds to a higher Safety score. The Efficiency and Cost Reduction score is inversely proportional to the Medicare Spending per Beneficiary measure. A lower MSPB means the patient had lower charges and more efficient care.²⁶ Low MSPB scores translate to higher Efficiency and Cost Reduction scores for the hospital.²⁷

Each of these TPS components capture unique and important aspects of hospital quality, and I will analyze hospital characteristics effects on each of these components to discover the drivers of hospital characteristic effects on the TPS quality measure.

TPS dummy based on 50th percentile cutoff (TPS50)

TPS was developed as part of the Value-Based Purchasing (VBP) program in healthcare and has financial incentives tied to it. Hospitals in the top 50% of TPS receive

²⁵ CMS.gov, "2014 Measure Information About the Medicare Spending per Beneficiary, Calculated for the Value-Based Payment Modifier Program"

²⁶ "2014 Measure Information About the Medicare Spending per Beneficiary, Calculated for the Value-Based Payment Modifier Program" Centers For Medicare & Medicaid Services. Last modified April 2015, <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeedbackProgram/Downloads/2014-MIF-MSPB-TIN-2015-May.pdf>

²⁷ Wheeler-Bunch, Bethany, MSHA "Hospital Value-Based Purchasing (VBP) Program Fiscal Year (FY) 2018 Percentage Payment Summary Report (PPSR) Overview Presentation" July 24, 2017.

payments which are funded by penalties imposed on hospitals in the bottom 50% of TPS.

The use of this median cut dummy variable will allow me to investigate the effect of profit status on the likelihood of paying a fine or receiving a bonus.

4.3.2 Measuring Financial Performance

Common Sized Profit (CSprofit)

I use common-sized profit as a dependent variable to examine the factors that most greatly influence profit maximization in hospitals. The profit is common-sized to control for size of the hospital and potential cost differences that could arise in looking at the dollar amount of profit. It is expressed in percentage form rather than decimal form for ease of interpretation.

Patient Revenue (patientrev)

Using all the same explanatory variables as used in the regression with common sizes profit as the dependent variables, the use of patient revenue as the dependent variable allows me to examine how the identified hospital characteristics affect patient revenue and the hospital costs. Without explicit information regarding hospital cost structure, this comparison of two regressions gives me an idea of the drivers of certain hospital costs. Patient Revenue is measured in millions of dollars.

4.4 Independent Variables

Profit Status (profitstatus)

In my sample, I limited my hospital scope to examine for-profit hospitals and private, non-religiously affiliated not-for-profit hospitals. Thus not-for-profit hospitals associated with a church and government owned hospitals were excluded from the sample.

I used a dummy variable to indicate the profit status for the hospital, with a value of one representing a for-profit hospital, and a value of zero representing the not-for-profit hospitals in my sample.

Profit Status and Common Sized Profit Interaction (statusCSprofit)

This interaction variable examined the effect on quality that profitability has given that the hospital is a for-profit hospital.

State Uninsured Rate (uninsured)

This variable records the medically uninsured rate for the state in which a given hospital is located.

Medicare Expansion State (MedicareExpansion)

A dummy variable is used to indicate if a given hospital is located in a Medicare expansion state. The variable takes a value of one if the hospital is in a Medicare expansion state, and zero if not.

Uninsured Rate and Medicare Expansion Interaction (uninsuredXexpansion)

This interaction captures the effect of the state's uninsured rate given that it is a Medicare expansion state on profitability and patient revenue.

Case Mix Index (CMI)

Case Mix Index “is analogous to product mix in a manufacturing context.”²⁸ Each procedure performed at a hospital is grouped into a Diagnosis Related Group (DRG) and each DRG is assigned a relative weight. The relative weights are added up and divided by the total number of DRG's for the year to get CMI. CMI was designed to calculate hospital payments, and so gives relative information regarding hospital reimbursement.²⁹ It is used principally as a control variable to control for hospitals performing different procedures.

Top 50% of TPS (TPS50)

The variable remains the same as mentioned above in the dependent variable section. It is included as an independent variable in regressions (7) and (8) since the top 50% of TPS hospitals receive a monetary bonus and the bottom 50% pay a fine, which may impact profitability and patient revenue.

Chapter 5. Results

²⁸ Younis, Mustafa, et al. “Hospital profitability in Florida: a revisitation” *Research in Healthcare Financial Management* 8, no. 1 (2003). ISSN: 1524-1521. <http://www.freepatentsonline.com/article/Research-in-Healthcare-Financial-Management/100108379.html>

²⁹ Mendez, Carmen M. MD, et al. “Impact of Hospital Variable on Case Mix Index as a Marker of Disease Severity” *Population Health Management* 17, no.1 (2014): 28-34. DOI: 10.1089/pop.20130002

5.1 Descriptive Statistics

Table 1 provides the descriptive statistics for all hospitals in the data set, while Tables 2 and 3 break up the descriptive statistics by non-profit hospitals and for-profit hospitals respectively. The descriptive statistics in Tables 2 and 3 provide some interesting information regarding hospital financial strategy and quality emphasis. The significance of the differences will be discussed with the results of the regressions, but a few notable findings will be touched up here.

The first difference to note is in the CSprofit variable. As mentioned in the Methodology section, this variable measures Net Income as a percentage of Total Revenue. The most profitable hospitals are extremely similar for non-profits and for-profits, earning a Net Income that is 12.07% and 12.21% of Total Revenue respectively. But the least profitable non-profit and for-profit hospitals show a stark contrast that highlights the emphasis of for-profit hospitals on profit maximization and the lowered emphasis for non-profit hospitals. The least profitable non-profit hospital had a loss that was 21.77% of Total Revenue, while the least profitable for-profit hospital's loss was only 4.71% of Total Revenue. The large loss posted by the least profitable non-profit hospital could indicate a "big bath" year, where many assets are written down to lower future expenses, while increasing the loss in the current year. More likely it represents financial trouble for that hospital. This is backed up by the lower average common sized profit for non-profit hospitals in comparison to for-profits. This makes non-profit hospitals more susceptible to financial trouble in the event of a negative shock to the market.

The profit maximization emphasis also shows up through the difference in patient revenue. Hospitals negotiate reimbursement rates with insurance companies, but these rates vary between hospitals and insurance companies. For-profit hospitals are more likely to negotiate the profit-maximizing price with insurance companies, which would raise the patient income. In the data set, this shows as both the minimum and maximum patient revenue of for-profit hospitals is higher than the minimum and maximum for non-profit hospitals. In combination with the difference in profitability, the stark difference in patient revenue demonstrates the for-profit hospital's increased emphasis on profit maximization in comparison to their non-profit counterparts.

5.2 Regression Results

After running regressions to test each hypothesis, the following results were produced (Tables 4 and 5). Examining profit status' effect on quality in the broadest sense, hypothesis 2(a) was supported. For-profit status led to Total Performance Scores that were 6.41 points lower than the scores of non-profit hospitals. This impact is statistically significant with a p-value of $p=0.000$. The difference in quality is an important finding to note as it represents a 6.41% difference when calculated from the range of possible scores, but when looking at the range of scores in the sample, the difference grows to an 11.68% difference. The interaction variable between profit status and common sized profit was not statistically different from zero, but the sign is interesting to note. The effect of this variable was positive meaning that the more

profitable for-profit hospitals had slightly higher TPS scores than non-profit hospitals.

Next I will look at which aspects of quality drive this difference in overall quality.

Once broken down into its four components, the regressions provided supports for hypotheses 2(b) and 2(c). Neither the Clinical Care nor Safety components of TPS were significantly affected by the profit status of the hospital, providing support for hypothesis 2(b). The interaction variable also did not come back statistically significant in either regression. These results indicate that for-profit and non-profit hospitals do not differ in terms of Clinical Care and Safety. In the healthcare industry, this is important to note, because it tells us that profit maximization does not go so far as to affect survival rates or infection rates. Had the regressions shown a significant effect by profit status on either of these TPS components, it would be concerning to see a differing emphasis on the basic parts of healthcare based on differing management goals.

While there was no effect on Safety or Clinical Care, profit status had a statistically significant effect on both Patient Experience and Cost Reduction and Efficiency scores. Looking closer at the Patient Experience regression, I found that for-profit hospitals have Patient Experience scores 8.78 points lower than their non-profit counterparts. This result had a p-value of $p=0.001$ making it statistically significant at the 0.1% level. For-profit status also had a negative impact on the Cost Reduction and Efficiency score. For-profit status led to Cost Reduction scores 10.89 points lower than non-profit status. The result is statistically significant at the 1% level with a p-value of $p=0.007$. This means that for-profit hospitals are worse at reducing costs for the patient, which follows profit maximization theory. The interaction variable in this regression is

statistically significant at the 10% level, where a 1% increase in common sized profit in a for-profit hospital corresponds to a 1.43 point increase in Cost Reduction score. This goes against the impact of profit status, but is an interesting finding. Potential reasons will be explored in the following Discussion section.

The final regression examining profit status' impact on quality used a median cutoff dummy variable to see if for-profit status made a hospital more or less likely than a non-profit hospital to pay the fine associated with being in the bottom 50% of TPS scores. This would provide additional support for hypothesis 2(a). Running a logit regression, I found for-profit status makes a hospital significantly more likely to be in the lower 50% of Total Performance Scores.³⁰ Again, the interaction variable between profit status and common sized profit was not statistically significant.

Shifting focus to the market drivers of profitability and patient revenue, the market characteristics examined often had opposite effects on profitability and patient revenue. For-profit status has a positive impact on common sized profit, increasing common sized profit by .82 percentage points from non-profit status, but this result is only significant at the 10% level. This provides support for hypothesis 3(d), even if the support isn't the strongest.

Common sized profit is negatively impacted by high uninsured rates in the state and a state's election of Medicare expansion. A one percent increase in uninsured rate leads to a .36 percentage point decrease in common sized profit. This is consistent with

³⁰ I also ran this as an ordinary least squares regression and found consistent results, a negative impact, but with a smaller coefficient. Results are shown in Table 6 in the Appendix. I felt that a logit regression was more appropriate due to the binary nature of the dependent variable.

the findings of Garthwaite *et al.* (2018) and supports hypothesis 3(b). Hypothesis 3(c) was also supported as hospitals located in Medicare expansion states see their common sized profit decrease by 4.65 percentage points. Both the uninsured and Medicare expansion coefficients are significant at the 1% level.

Interestingly, the interaction variable between the uninsured rate of the state and the election of Medicare expansion has a positive coefficient. That is to say, for a hospital located in a Medicare expansion state, a one percent increase in the uninsured rate increases common sized profit by .45 percentage points. This effect is statistically significant at the 2% level with a p-value of $p=0.015$. This seems to conflict with the previous findings for the individual effects of uninsured rates and election of Medicare expansion, but this result has a logical rationale behind it, which will be discussed in the following Discussion section.

The Case Mix Index of a hospital has a large, positive impact on common sized profit. A one unit increase in Case Mix Index corresponds to a 2.72 percentage point increase in common sized profit. Considering the range of Case Mix Indexes measured, it is highly unlikely that a hospital could change their Case Mix Index by a full unit, so this full effect would likely not be observed year over year. This result is statistically significant at the 2% level.

As mentioned before, hospitals in the bottom 50% of TPS pay a fine and those in the top 50% receive a bonus. I hypothesized that this incentive tied to TPS would impact profitability by increasing profitability if a hospital was in the top 50% of scores. I found

that receiving the monetary bonus for being in the top 50% of scores does not have an effect on common sized profit. This did not support hypothesis 3(a).

Examining the same characteristics effect on patient revenue, I found that for-profit status means that a hospital will have patient revenue 108 million dollars more than non-profit status, supporting hypothesis 4(a). This is statistically significant at the 2% level and is consistent with the results from regression 5. Hypothesis 4(a) was also supported by the positive coefficient for the Medicare expansion variable. Hospitals located in a Medicare expansion state have patient revenues 319.75 million dollars more than hospitals not in expansion states. This effect is significant at the 5% level with a p-value of $p=0.042$.

The uninsured rate also has a positive impact on patient revenue, which does not support hypothesis 4(b). A one percent increase in the uninsured rate of a state leads to an increase in patient revenue of 40.72 million dollars. This is statistically significant with a p-value of $p=0.001$. The interaction variable between uninsured rate and Medicare expansion, while significant in the common sized profit regression, is not statistically significant in this regression.

Case Mix Index has large impact on patient revenue. A one unit increase in CMI corresponds with an almost 588 million dollar increase in patient revenue. This supports the design of CMI as a method of calculating reimbursement for hospitals, and is statistically significant.

Hypothesis 4(c) was not supported as I hypothesized that the presence of a hospital in the top 50% of TPS would not have an effect on patient revenue, but I found

that it does have a statistically significant impact. Hospitals in the top 50% of TPS have patient revenues 90.5 million dollars lower than hospitals in the bottom 50% of scores.

Chapter 6. Discussion

6.1 Effects on Quality

As seen in the results for regressions 1-6, for-profit status has a negative impact on overall quality, and more specifically on Patient Experience and Cost Reduction. Using the logic of Picone *et al.* (2002) and Jha *et al.* (2008), the likely explanation behind for-profit's negative impact on Patient Experience has to do with hospital staffing. Both studies found that non-profit hospitals tend to have higher employment rates than for-profit hospitals. Hospital staff typically accounts for a large percentage of hospital costs, and can be seen as an area where costs can be cut. Cutting these costs could mean lower staff numbers or cutting down on employee training past what is required for the industry. Either of these methods of cutting costs could explain the worse scores for Patient Experience. Jha *et al.* (2008) found that hospitals with higher employment received better ratings from patients regarding discharge instructions, communication with nurses, and communication about medications. A reduced nursing staff means the nurses are responsible for more patients at any given time, which will lower the amount of time spent with each patient. This can reduce communication with the patient and thus lower Patient Experience ratings.

Even though Patient Experience scores are worse at for-profit hospitals, potential staff reductions don't go as far as to negatively impact the survival rates or increase infection rates. This means there is a threshold above which more hospital staff can enhance patient experiences and below which can affect the quality of the treatment itself. Profit maximization doesn't drive hospitals to cut staffing so much that patient outcomes are affected, which is reassuring to see.

The negative impact of for-profit status on the Cost Reduction and Efficiency score ties to profit maximization. Since higher scores in this domain correspond with lower costs for the patient, this negative impact makes sense. For-profit institutions are likely to charge higher prices than non-profits as part of their goal to maximize profits. Also in negotiations with insurance companies regarding rates, for-profit hospitals are more likely to negotiate the profit maximizing price which likely raises costs for the patient. Also in this regression, the interaction variable was statistically significant at the 10% level. With a positive coefficient, this interaction variable is an interesting finding. Of for-profit hospitals, more profitable hospitals score better on Cost Reduction score. This may be due to these hospitals finding other revenue streams and passing on some savings to the patients through lower rates. Another possibility is these hospitals are extremely efficient with their care, and efficient processes save both the hospital and the patient money. Without more information, this is an interesting trend to note, and is worth looking into further.

The results from regression 6 tell us that even though there is a financial incentive to have higher quality, the bonus for high quality likely isn't high enough to convince

hospitals to spend the money required to raise their Total Performance Score. Conversely, the fine for lower quality likely isn't punitive enough to incentivize hospitals to try and raise their TPS. This would explain why for-profit hospitals are more likely to be in the bottom 50% of TPS.

6.2 Drivers of Profitability

The positive coefficient on the profit status variable was expected because for-profit institutions are supposed to be more concerned with earning a profit than non-profit institutions. Also as Garthwaite *et al.* (2018) explained, non-profit hospitals must provide community benefit in order to maintain tax-exempt status. One example of community benefit is providing uncompensated care to the uninsured, which cuts into profitability. Other community benefits also require financial investment, making giving non-profit hospitals an additional cost that for-profit hospitals do not deal with. An interesting extension would be to research further non-profit hospitals spending on community benefit to find out the most beneficial services non-profits provide, and which ones are most cost effective.

The impacts of uninsured rates and Medicare expansion are consistent with prior research of Garthwaite *et al.* (2018) and Selden *et al.* (2015). Both uninsured and Medicare patients often reimburse the hospital less than privately insured patients, so for the same treatments, these people are less profitable consumers of care. The presence of EMTALA however doesn't allow for hospitals to refuse care for these patients if emergency treatment is needed. But as suggested by Garthwaite *et al.* (2018), for-profit

hospitals may adjust the quantity of care for these patients to minimize losses from these patients. The next extension would be to compare the amount of care given to patients for a certain condition at a non-profit hospital versus at a for-profit hospital, and make this comparison for each type of insurance: private, public, and uninsured. Not only would this give us information as to if hospitals tailor down quantity of care based on insurance, but would also give insight into the efficiency of hospital care for certain patients. This extension would have to control for patients having the same outcomes to reveal relevant trends in efficiency of care for certain patients.

The interesting result of this regression was the positive coefficient of the interaction variable between uninsured rate and election of Medicare expansion. From a strictly math perspective, this makes sense as both uninsured and Medicare expansion variables have negative coefficients so multiplying two negatives together gives a positive answer. There are two possible explanations to understand the underlying logic of this result. The first is that uninsured patients visit the hospital with only 8% of uninsured patients reporting an inpatient hospital visit in a survey conducted by Garthwaite *et al.* (2018). Thus in a state with Medicare expansion, where more of the population is covered by Medicare insurance, a higher uninsured population decreases the number of people visiting the hospital as lower paying patients, which would help profitability. The other explanation extends off of the research of Batty and Ippolito (2017). Fair pricing laws exist in a few states, capping the amount hospitals can charge uninsured patients, but they do not exist in most states. In the absence of these laws, for-profit institutions can bill uninsured patients the list price of a procedure. Thus in a state with Medicare expansion and no fair pricing law, a higher uninsured rate means more

uninsured patients will visit the hospital and get billed the list prices instead of the Medicare negotiated rates. Anything the hospital is able to collect above the Medicare negotiated price increases the profitability of that patient.

The Case Mix Index variable was found to have the expected impact on common sized profit as it was designed to help determine relative reimbursement for different procedures. More complicated procedures will be given a higher relative weight and thus be reimbursed more than a less complicated procedure. A hospital has some control over their CMI, as they can choose to perform more complicated procedures. This would make for an interesting follow up research question, one which examined the changes in CMI year over year and how that related to the profitability of an individual hospital. There would be some noise due to external factors, but some of those can be controlled. This potential research would reveal some information regarding the thought process of hospital management regarding their view of hospital treatments offered as a way to increase financial success.

Finally, in this regression, the dummy variable for hospitals in the top 50% of TPS produced a result that was not statistically significant. This indicates that the financial benefit received for being in the top half of quality ratings is not a major factor in determining profitability. I had hypothesized it would positively impact profitability because it was a payment received outside of normal operations, but the non-impact it has says otherwise. This may result from significantly higher costs associated with increasing quality ratings. Potentially the benefits and fines associated with the median cutoff of

TPS would need to be increased to truly incentivize hospitals to increase quality, as then these benefits and fines would have a legitimate impact on profitability.

6.3 Drivers of Patient Revenue

Similar to the reasoning behind the effect of profit status on profitability, for-profit status has a positive impact on patient revenue. Through the negotiation of profit maximizing prices with insurance companies in addition to not always being subjected to fair pricing laws, for-profit hospitals are able to derive more revenue from patients. With more information, it would be an interesting study to investigate the difference in negotiated prices, and to compare by hospital location and by insurer.

In hypothesis 4(a), I stated that the election of Medicare expansion would have a positive impact on patient revenue and this hypothesis was supported by the results of regression 8. As Garthwaite *et al.* (2018) found, people without health insurance are highly unlikely to make hospital visits. Medicare expansion provides public health insurance to some of the uninsured population. With insurance coverage, people are more likely to take a hospital visit than when uninsured because they know that insurance will likely cover at least some of the medical bills. Thus the election of Medicare expansion increases the patient revenue of a hospital.

In hypothesis 4(b), I predicted that the uninsured rate would have a negative impact on patient revenue. This was not supported by the results of regression 8. Regression 8 showed that uninsured rate has a positive impact on patient revenue. While uninsured patients represent the vast majority of uncompensated care costs, they are still

billed for their medical care, and in the absence of fair pricing laws, they may be billed at the full list price for the treatment. This billing may lead to an increase in revenues because hospitals may be able to collect more from some of these patients than from insurance companies. An alternate explanation follows the study by Garthwaite *et al.* (2018). That study found that non-profit hospitals either do not pass on uncompensated care costs to insured patients, or are not good at passing along these costs. This doesn't mean that for-profit hospitals have this same problem. For-profit hospitals already negotiate profit-maximizing prices with insurance companies, but this price may be higher in states with a higher uninsured rate, which effectively passes the uncompensated care costs to insured patients. This cost shifting can result in an increase in patient revenue with these higher revenues from insured patients plus whatever a hospital can collect from uninsured patients.

While both uninsured rate and Medicare expansion variables have positive coefficients for their individual impacts, the interaction variable between these two market characteristics has a negative coefficient. It is not statistically significant but is interesting to note. Further study is needed to see if this interaction is still not statistically significant in a larger sample, or with more localized uninsured rates.

As explained in section 6.2, Case Mix Index was implemented as a way to determine relative reimbursement for hospitals. Higher CMI results in more compensation, and seems like a fairly direct characteristic for hospitals to target if they want to increase patient revenues and profitability.

Contrary to my hypotheses 3(a) and 4(c), a hospital's presence in the top 50% of TPS did not impact profitability but did impact patient revenue. I predicted there would be no effect on patient revenue because the payment associated with being in the top 50% of TPS wouldn't be considered patient revenue, but regression 8 showed that hospitals in the top 50% of TPS have over 90 million dollars less patient revenue than those in the bottom 50%. The likely explanation is that the hospitals in the top 50% of TPS received higher scores in the Cost Reduction domain, meaning they were better at cost reduction for the patient. These high marks in this domain would explain the lower patient revenues of these hospitals.

Chapter 7. Conclusion

7.1 Implications

Through the support found for hypotheses 2-4, with the exception of hypotheses 3(a) and 4(b), the outcomes examined provide overall support for hypothesis 1(a). Supporting hypothesis 1(a), the effect of for profit status on the quality of care is overall negative, and more specifically negative with respect to customer experience and cost reduction for the patient. These two measures of quality represent the two measures in which management can make decisions regarding spending and revenues without affecting baseline care levels. The patients can experience varying levels of payments and customer satisfaction, but their outcomes will not be affected by these decisions.

Additionally, for-profit status has a positive impact on both profitability and patient revenue of the hospital. These are not be all end all financial measures, but they provide support for hypothesis 1(a) and insight into the managerial focus of for-profit hospitals.

On the comparison in hypothesis 1(a), non-profit status had a positive impact on the composite quality measure, and more specifically a positive impact on customer experience and cost reduction for the patient. The improvement of these quality measures over for-profit hospitals highlights the emphasis on higher quality care outside of the basics of care, such as survival and infection prevention, which supports part of hypothesis 1(a). Looking at the other half of the hypothesis, non-profit status had a negative effect on both patient revenue and profitability. This demonstrates the shift of the balance between performance in financial measures and quality measures from non-profit hospitals to for-profit hospitals. Additionally, non-profit status makes the hospital more likely to be in the top 50% of Total Performance Scores, with which a monetary bonus is associated, yet this doesn't impact profitability and hurts patient revenue. This shows no financial incentive to improving the aspects of quality that are positively affected by non-profit status.

7.2 Avenues for Future Research

Overall, the results demonstrate support for my hypotheses regarding a shift in the balance between financial performance and quality performance. More research is necessary in order to develop more complete support for these hypotheses. First, it would be worthwhile to track this sample over a span of time to capture the effect of market fluctuations on these emphases through the impact of the outcomes. It would also be a

good extension to gain access to fuller financial statements for the hospitals in this sample to examine the effects on other financial measures to garner further support for the hypotheses.

It would be an interesting expansion to evaluate these hypotheses and models for hospitals larger than those within my sample (hospitals with greater than 200 beds). These hospitals have different operating environments than the small hospitals I examined, often serve more diverse populations, and may offer a wider range of care specialties. This extension would provide information that speaks to the alignment or disconnect between managerial focus of large versus small for-profit or non-profit hospitals.

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Appendix

Table 1. Descriptive Statistics for variables included in OLS regressions.

Variable	N	Mean	Std. Dev.	Min	Max
TPS	247	40.89	11.16	11.88	66.75
ClinicalCare	238	40.73	20.36	0	100
PatientExperience	241	35.61	17.85	2	90
SafetyScore	239	61.13	17.86	18	100
CostRedScore	241	26.72	27.01	0	100
TPS50	247	0.50	0.5	0	1
CSprofit	247	1.92	3.64	-21.77	12.21
patientrev	247	478.1603	373.9731	79.06553	2715.36
profitstatus	247	0.45	0.50	0	1
statusCSprofit	247	1.08	2.34	-4.71	12.21
uninsured	247	8.30	3.07	2.50	16.60
MedicareExpansion	247	0.56	0.49	0	1
uninsuredXexpansion	247	3.73	3.78	0	14
CMI	247	1.5113	0.21	1.1072	2.3335

Table 2. Descriptive statistics for hospital specific characteristics (non-profit hospitals).

Variable	N	Mean	Std. Dev.	Min	Max
TPS	136	43.59	10.73	18.81	66.5
ClinicalCare	131	40.72	21.34	0	90
PatientExperience	132	38.8	18.62	5	90
SafetyScore	132	60.99	17.22	18	100
CostRedScore	132	30.08	28.38	0	100
TPS50	136	0.6	0.49	0	1
CSprofit	136	1.52	4.05	-21.77	12.07
patientrev	136	397.3023	297.6	79.06553	1871.637
CMI	136	1.4875	0.17	1.1092	2.0925

Table 3. Descriptive statistics for hospital specific characteristics (for-profit hospitals).

Variable	N	Mean	Std. Dev	Min	Max
TPS	111	37.59	10.81	11.88	66.75
ClinicalCare	107	40.74	19.19	0	100
PatientExperience	109	31.76	16.14	2	82
SafetyScore	107	61.31	18.69	20	100
CostRedScore	109	22.66	24.78	0	100
TPS50	111	0.38	0.49	0	1
CSprofit	111	2.4	3.01	-4.71	12.21
patientrev	111	577.23	431.4	99.52667	2715.36
CMI	111	1.5405	0.25	1.1072	2.3335

Table 4. Results from regressions (1)-(6) examining effects on quality of hospital care. Note that regression (6) is a logit regression, thus the R-Squared listed is actually the Pseudo R2.

Regression	(1)	(2)	(3)	(4)	(5)	(6)
Variables	TPS	Clinical Care	Patient Experience	Safety Score	CostRed Score	TPS50
profitstatus	-6.41*** (1.61)	-0.46 (3.10)	-8.78*** (2.64)	1.84 (2.70)	-10.89*** (4.02)	-0.99*** (0.31)
statusCSprofit	0.17 (0.34)	0.21 (0.68)	0.72 (0.56)	-0.64 (0.58)	1.43* (0.85)	0.03 (0.06)
Observations	247	238	241	239	241	247
R-Squared	0.0729	0.0004	0.0453	0.0053	0.0304	0.037
F	9.59	0.05	5.65	0.63	3.73	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Results from regressions (7) and (8) examining effects on financial measures.

Regression	(7)	(8)
Variables	CSprofit	Patientrev
profitstatus	0.82* (0.48)	108.23** (43.77)
uninsured	-0.36*** (0.14)	40.72*** (12.67)
MedicareExpansion	-4.65*** (1.71)	319.75** (156.32)
uninsuredXexpansion	0.45** (0.18)	-19.03 (16.98)
CMI	2.72** (1.11)	587.94*** (101.58)
TPS50	0.26 (0.47)	-90.48** (42.98)
Observations	247	247
R-Squared	0.0687	0.2594
F	2.95	14.01

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Results from regression (6) using the OLS method.

Variable	TPS50
Profitstatus	-0.24*** (0.07)
statusCSprofit	0.01 (0.02)
Observations	247
R-Squared	0.0508
F	6.53

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1